Nursing Informatics in Times of COVID-19: Achievements, Challenges, and New Ideas

An AMIA NIWG, ANI Collaboration

April 14, 2020
Agenda

• Brief introductions
  • AMIA & the Globe of Health Informatics
  • Nursing Informatics Working Group
  • The Alliance for Nursing Informatics

• Presentations
  •ANI Survey and COVID-19
  • COVID-19 Nursing Plans
  • ML-based models to support operations and resources in NYC
  • COVID-19 Response Guidelines encoded with SNOMED CT & the Omaha System
  • The Role of a Cognitive Patient Care Device
Health Informatics is the science of how to use data, information, and knowledge to improve human health, including the execution of scientific research, the delivery of health care services, and the promotion of public health.

AMIA is the multi-disciplinary, inter-professional home for 5,400+ health informatics experts.
Working Groups of AMIA

Biomedical Imaging Informatics
Clinical Decision Support
Clinical Information Systems
Clinical Research Informatics
Consumer and Pervasive Health Informatics
Dental Informatics
Education
Evaluation
Bioinformatics
Ethical, Legal and Social Issues
Genomics and Translational Global Health Informatics
People and Organizational Issues

Intensive Care Informatics
Knowledge Discovery and Data Mining
Knowledge Representation and Semantics
Nursing Informatics
Open Source Student
Pharmacoinformatics
Primary Care Informatics
Public Health Informatics
Regional Informatics Action
Visual Analytics
Natural Language Processing
To highlight how our members and the broader informatics community is addressing this global pandemic we are launching the AMIA COVID-19 Webinar Series.

We will look at the pandemic through a health informatics lens and is designed to share informatics responses to the COVID-19 pandemic. Panelists will share their specific domain expertise, including clinical informatics, public health informatics, translational bioinformatics, clinical research informatics, and consumer health informatics. We will also have special emphasis webinars covering topics related to global health, telemedicine, and public policy during the COVID-19 pandemic. These webinars are open to all at no cost.
Several additional webinars are being planned to highlight members of AMIA and the wider informatics community; Visit AMIA.org/COVID19
A Collaboration Webinar on Nursing Informatics

Alliance for Nursing Informatics

Our Vision: Transform health and health care through nursing informatics.

Our Mission: To advance nursing informatics practice, education, policy, research and leadership through a unified voice of nursing informatics organizations.
The **AMIA Nursing Informatics Working Group (NIWG)** provides numerous mechanisms to help members connect, learn, grow, and lead in the field, including:

- **Networking** – a platform for members old and new to collaborate, meet new colleagues, and become involved in the development of positions, issues, white papers, programs, and other activities that benefit the informatics community.

- **Educational Opportunities** – the opportunity to learn from nursing informatics leaders across the country and throughout the world.

- **Mentoring** – a place for members to give and receive mentoring throughout the informatics careers.

- **Shaping the Future** – the opportunity to work together to make a difference in the future of nursing informatics and establish technologies to meet inter-professional workflow needs, provide for the presentation and retrieval of information that supports patient-centered care, and develop standards for an interoperable national data infrastructure.

NIWG serves as the United States representative to the International Medical Informatics Association (IMIA) Nursing Informatics Special Interest Group.
The Alliance for Nursing Informatics (ANI) advances nursing informatics leadership, practice, education, policy and research through a unified voice of nursing informatics organizations. We transform health and healthcare through nursing informatics and innovation. ANI is a collaboration of organizations that represents more than 20,000 nurse informaticists and brings together 25 distinct nursing informatics groups globally. ANI crosses academia, practice, industry, and nursing specialty boundaries and works in collaboration with the more than 4 million nurses in practice today.

ANI is dedicated to:

- Fostering further development of a united voice for nursing informatics
- Providing a single point of connection between nursing informatics individuals and groups, and the broader nursing and healthcare community
- Transform health and health care through nursing informatics by developing resources, guidelines and standards for nursing informatics practice, education, scope of practice, research, certification, public policy, terminology, best practice guidelines, mentoring, advocacy, networking and career services
- Supporting individual membership in the affiliated nursing informatics organizations
Moderators

- Maxim (Max) Topaz, PhD, RN, MA, Elizabeth Standish Gill Associate Professor of Nursing, Columbia University Medical Center and the Columbia University Data Science Institute; Associate Professor of Nursing, Center for Home Care Policy & Research, Visiting Nurse Service of New York; Postdoctoral Research Fellow, Harvard Medical School & Brigham and Women's Hospital
- Gregory Alexander, PhD, RN, FAAN, Professor, Columbia University School of Nursing, New York; Member, National Advisory Council, AHRQ

Panelists (in order of appearance)

- Susan C. Hull, MSN, RN-BC, NEA-BC, FAMIA, Chief Health Information Officer, CareLoop, Inc; Co-chair, Alliance for Nursing Informatics (ANI)
- Karen Dunn Lopez, PhD, MPH, RN, Associate Professor, Director of Research, Center for Nursing Classification and Clinical Effectiveness, The University of Iowa College of Nursing
- Kenrick Cato, PhD, RN, CPHIMs, Assistant Professor of Nursing, Columbia University School of Nursing
- Karen A. Monsen, PhD, RN, FAMIA, FAAN, Professor, School of Nursing; Director, Center for Nursing Informatics; Director, Omaha System Partnership, University of Minnesota School of Nursing
- Michael Wang, RN, MBA, Founder and CEO, Inspiren
Susan C. Hull
MSN, RN-BC, NEA-BC, FAMIA

Chief Health Information Officer
CareLoop, Inc.

Co-Chair Alliance for Nursing Informatics (ANI)

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@informaticsani
Correlations between ANI survey results and COVID-19 informatics successes and challenges
ANI Governing Directors Survey

Feedback and collaboration on resource sharing

• Describe some information resources that you are finding most useful for combating COVID-19?

• What are the information needs that are still most pressing for managing your COVID-19 response?

• How is information technology helping in your COVID-19 response?

• What role is social media playing in your COVID-19 response?

• What novel innovations are you most proud of within your ANI member organization?
ANI Governing Directors Response

**Nursing Documentation:**
- What are best practice strategies for approaching nursing documentation, etc.
- How to gather important data without increasing burden at the point of care
- How to document ventilators that are split between multiple patients
- Collecting data from patients remotely, including symptoms and vitals, capturing remote consents
- Virtual family visits, including end of life care

**Additional topics:**
- Tracking patients to ventilators especially during care transitions and moving between hospital
- Overview of external reporting requirements needed by the CDC
- CDCPHIN-VADS coding
- Creating and adapting terminologies
- Summary of the first iteration of a COVID19 FHIR Implementation Guide 0.2.0
- Core data sets; what's new and what's already in existing documentation – how to discern?
- What are hospitals doing to report straight to HHS via a flat file format?
Collaboration COVID Resource Sharing

This will be updated on-going as ANI member organizations provide resources related to Nursing Informatics and COVID-19:

- **AMIA** Webinar Series
- **ANIA Toolkit** with various resources
- **AORN tool kit** with various resources
- **Elsevier's Novel Coronavirus Information Center**
- **HIMSS** Coronavirus Resource Page
- **LitCovid**: Curated literature hub for tracking up-to-date scientific information about the 2019 novel Coronavirus
- **NASN**: Resources including those specific for **talking to children** and **teaching them** about COVID; and **activities school nurses can be doing** during this time.
- **Omaha System Guidelines**: A comprehensive international perspective based on WHO and CDC references, dual encoded with SNOMED CT and Omaha System codes.
- **ONS resources** to assist in caring for people with cancer while we also cope with the COVID-19 priorities
Logica has released first iteration of COVID-19 FHIR Implementation Guide 0.2.0 released April 3, 2020

COVID-19 Interoperability Project

Part of the COVID-19 Interoperability Alliance – https://covid19ia.org

Logica is coordinating iterative releases of COVID-19 and SARS-CoV-2-related clinical information models, value sets, and interoperability resources.

All assets are available under Open Source license free of charge and are targeted at health systems and HIT implementers to rapidly produce semantically...
Rapid Collaboration: itepcovid.com
Karen Dunn Lopez
PhD, MPH, RN
Associate Professor
Director of Research, Center for Nursing Classification and Clinical Effectiveness
The University of Iowa College of Nursing

@karendunnlopez  karen-dunn-lopez@uiowa.edu
Developing and implementing evidence-linked interoperable standardized nursing plans when caring for COVID-19 patients
The Center for Nursing Classification and Clinical Effectiveness (CNC)

- Located at the University of Iowa, College of Nursing
- Developers of 2 Research Based Standardized Nursing Terminologies
  - Nursing Interventions Classification (NIC)
  - Nursing Outcomes Classification (NOC)
- Linkages to NANDA International (NANDA-I) Nursing Diagnoses
- Used internationally by nursing across the care continuum, ambulatory through acute and community care
- Codified, interoperable and mapped to SNOMED CT
Why do we need Pandemically Focused Nursing Plans of Care

1. Guidance to novice and nurses that have crossed trained in response to the pandemic
   - Efficient decision making
   - Goal of more effective nursing care

2. Measurable outcomes of nursing care to determine effectiveness of care
   - Within patients
   - Between patients

3. Enable data-powered learning health system approach for nursing care
Conceptual Model DRAFT
Nursing Care in Response to Pandemics

Potential or Actual Physiological Problems
Potential or Actual Psychological Problems
Plans of Nursing Care in Progress

1. Individual in the home/community without symptoms
2. Individual at home/community with symptoms ± positive test
3. Individual in hospital with severe symptoms ± positive test
4. Community level
## Example 1: Community

Table 1. NOC, and NIC linkages for Deficient Community Health (00215)

<table>
<thead>
<tr>
<th>NANDA-I diagnosis: Deficient Community Health (00215)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition: Presence of one or more health problems or factors that deter wellness or increase the risk of health problems experienced by an aggregate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome to measure resolution of diagnoses: Community Health Status (2701)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Suggested additional nursing outcomes to measure resolution of diagnoses</strong></td>
</tr>
<tr>
<td>Community Competence (2700)</td>
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<tr>
<td>Community Health Screening Effectiveness (2807)</td>
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<thead>
<tr>
<th>Suggested nursing interventions for problem resolution</th>
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<tbody>
<tr>
<td>Case Management (7320)</td>
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<tr>
<td>Communicable Disease Management (8820)</td>
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<tr>
<td>Community Health Advocacy (8510)</td>
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<td>Community Health Development (8500)</td>
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<td>Environmental Management: Community (6484)</td>
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<tr>
<td>Fiscal Resource Management (8550)</td>
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<tr>
<td>Health Education (5510)</td>
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<td>Health Policy Monitoring (7970)</td>
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<td>Health Screening (6520)</td>
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<tr>
<td>Program Development (8700)</td>
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<tr>
<td>Resiliency Promotion (8340)</td>
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<tr>
<td>Surveillance: Community (6652)</td>
</tr>
</tbody>
</table>
Example 2: Individual at home/community with symptoms + positive test

NANDA-I diagnosis: Ineffective Airway Clearance (00031).
Definition: Inability to clear secretions or obstructions from the respiratory tract to maintain a clear airway

<table>
<thead>
<tr>
<th>Outcome to measure resolution of diagnoses:</th>
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<tbody>
<tr>
<td>Respiratory Status: Airway Patency (0703)</td>
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<tr>
<td>Respiratory Status: Ventilation (0708)</td>
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<tr>
<th>Suggested additional outcomes to measure resolution of diagnosis</th>
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<tr>
<td>Immune Status (0702)</td>
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<td>Immunization Behavior (1900)</td>
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<tr>
<td>Respiratory Status (0415)</td>
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<tr>
<td>Respiratory Status: Airway Patency 0410</td>
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<td>Personal Health Status (2006)</td>
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<tr>
<td>Neurological Status: Cranial</td>
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<td>Sensory/Motor Function (0913)</td>
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<td>Respiratory Status: Gas Exchange (0402)</td>
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<td>Risk Control: Infectious Process (1924)</td>
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<tr>
<td>Self-Management: Asthma (0704)</td>
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<tr>
<td>Self-Management: Chronic Obstructive</td>
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<td>Pulmonary Disease (3103)</td>
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<td>Risk Control: Obesity (1941)</td>
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<td>Suffering Severity (2003)</td>
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<td>Smoking Cessation Behavior (1625)</td>
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<td>Tissue Perfusion: Pulmonary (0408)</td>
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<tr>
<td>Anxiety Level (1211)</td>
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<td>Fatigue Level (0007)</td>
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<td>Pain Level (2102)</td>
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<th>Suggested nursing interventions for problem resolution</th>
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<tbody>
<tr>
<td>Acid Base Monitoring (1920)</td>
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<tr>
<td>Airway Insertion and Stabilization (3120)</td>
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<td>Airway Management (7320)</td>
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<td>Airway Suctioning (3160)</td>
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<td>Airway Suctioning Physiotherapy (3230)</td>
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<td>Anxiety Reduction (5820)</td>
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<td>Artificial Airway Management (3180)</td>
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<td>Chest Physiotherapy (3230)</td>
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<td>Cough Enhancement (3250)</td>
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<td>Emergency Care (6200)</td>
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<td>Energy Management (0180)</td>
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<td>Energy Management (0180)</td>
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<td>Fluid Monitoring (4130)</td>
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<td>Positioning (0840)</td>
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<td>Respiratory Monitoring (3350)</td>
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<td>Oxygen Therapy (3320)</td>
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<td>Surveillance (6650)</td>
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<tr>
<td>Teaching: Individual (5606)</td>
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<tr>
<td>Vital Signs Monitoring (6680)</td>
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Plans

Dissemination

- http://www.nursing.uiowa.edu/cncce/facts
- https://itepcovid.com/
- https://www.allianceni.org/story/resources-covid-19
- Manuscripts - International Journal of Nursing Knowledge

Future Work

- Crosswalk with existing guidelines (CDC, WHO etc.)
- Validation studies with clinical nursing experts
- Developing new pandemic focused nursing concepts
- Iterative re-evaluation of plans of care with changing evidence and conditions
We are very interested in your feedback & ideas for this project

Sue Moorhead, PhD, RN, FAAN, Elizabeth Swanson, PhD, RN, Cheryl Wagner, PhD, RN Tamara Maciera, PhD, RN Vanessa Mantovani RN, MsC & Noriko Abe, MSN

classification-center@uiowa.edu
Using home-grown machine learning-based models to support operational needs and to track clinical resources during the New York City COVID-19 surge
Scaling up for Surge Capacity and COVID-19 Patient Tracking in the EHR: Leveraging Healthcare Process Modeling

KENRICK CATO, RN, PHD, SCHOOL OF NURSING & EMERGENCY DEPARTMENT, COLUMBIA UNIVERSITY
CHRIS KNAPLUND, MPHIL, DEPARTMENT OF BIOMEDICAL INFORMATICS, COLUMBIA UNIVERSITY
SARAH COLLINS ROSSETTI, RN, PHD, SCHOOL OF DEPARTMENT OF BIOMEDICAL INFORMATICS & NURSING, COLUMBIA UNIVERSITY
Communicating Narrative Concerns Entered by RNs (CONCERN)

THIS STUDY WAS FUNDED BY THE NATIONAL INSTITUTE OF NURSING RESEARCH (NINR): 1R01NR016941-01

COMMUNICATING NARRATIVE CONCERNS ENTERED BY RNs (CONCERN): CLINICAL DECISION SUPPORT COMMUNICATION FOR RISKY PATIENT STATES.

THE CONTENT IS SOLELY THE RESPONSIBILITY OF THE AUTHORS AND DOES NOT NECESSARILY REPRESENT THE OFFICIAL VIEWS OF THE NATIONAL INSTITUTES OF HEALTH.
Operational / Applied Clinical Informatics Problem During Hospital Surge

- Need to dynamically classify the level of care (ICU versus non-ICU) and other characteristics of a hospital bed
- Need to dynamically track ventilator usage
- EHR configurations are challenging for “scaling up” in pandemic and patient tracking
  - Bed management is a manual configuration
  - Hospital surge requires agile, frequent:
    - Creation of beds (e.g., OR turned into ICU)
    - Repurposing of beds (e.g., Neonatal ICU to Adult ICU)
  - Single items like an intubation order are not reliable in surge contexts
  - Overwhelms manual tracking capabilities
    - Even for EHR systems with automated tracking capability - because configurations are manual - the ability to validate settings with a data-driven model offers reliability in time of limited/stressed human resources
Healthcare Process Modeling: High-Level Summary

Healthcare Process Models –

- Identify features from user interaction with clinical systems which are patterns of clinical behaviors
- Patterns interpreted as proxies of an individual’s decisions, knowledge, and expertise
- Use patterns in predictive models for associations with outcomes

*Clinical domain expertise is essential for accurate and comprehensive interpretations.*
Healthcare Process Modeling: Bed Tracking Example

1. Identify features from user interaction with clinical systems (e.g., EHR data and metadata)
   - e.g., patterns of documentation

2. Apply and validate interpretations of those features with clinical domain expert input
   - e.g., frequency of vital sign documentation indicator of patient surveillance

3. Interpret features as proxies
   - e.g., increased surveillance beyond standard of care => acute concern about patient deterioration
   - ***Standard of care frequencies => level of care for bed classification***
Bed Tracking Use Case

1. **Foundational mapping** of beds (current state)
   - Need to sync with other Admission, Discharge, Transfer (ADT) systems

2. Identify **changes during surge**
   - Hospital needs to report on and demonstrate overcapacity
   - Virtual beds: not a physical location, a marker of patient bed status and used to flag level of care (e.g. in ED area B but admitted and waiting for inpatient med surg bed)
   - Holding beds: corresponds to physical bed, but not counted to hospital capacity

3. Tracking **new beds** as they come online
   - New ICU beds, ventilators

<table>
<thead>
<tr>
<th>Facility</th>
<th>Hospital Level</th>
<th>Patient Type</th>
<th>Level of Care</th>
<th>Bed Type</th>
<th>Physical Bed</th>
<th>Bed Name</th>
<th>Bed Code</th>
<th>COVID-19 bed</th>
</tr>
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<tbody>
<tr>
<td>Cornell ED</td>
<td>Adult ICU</td>
<td>Hallway/Holding</td>
<td>Virtual</td>
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<td>Lower Manhattan</td>
<td>Non ED MedSurg</td>
<td>Isolation</td>
<td>Non virtual</td>
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<td>Queens</td>
<td>Obstetrics</td>
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<td>MedSurg Pediatrics</td>
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<td>Nursery</td>
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Bed Surge Model

● **Features**
  ○ Number of flowsheet entries made on patients in this bed over a 24 hour period, grouped by observation ID
  ○ Total number of patients occupying this bed
  ○ Total time occupied
  ○ Average time occupied per patient

● Feature selection done to reduce number of features.

● **Outcomes**
  ○ Initially, type of unit + virtual unit.
  ○ For each unit type, approximately 4 known units used for training (i.e., ICU = 'G04S','G04W','G05S','G08S') and other units to be found through testing.
    ○ Multiclass logistic regression trained on 20 randomly selected days

● Logistic regression chosen so that prediction could be implemented into SQL stored procedure
● Stored procedure used for daily report generation
Model Performance: Training

Training metrics on 20 randomly selected model training days
- 526 Observation Ids as features (possible ~7,367)
- Classifies ~ 400 beds every 24 hours

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<thead>
<tr>
<th>Unit Type</th>
<th>Precision</th>
<th>Recall</th>
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</thead>
<tbody>
<tr>
<td>Intensive care Unit (ICU)</td>
<td>1.00</td>
<td>0.98</td>
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<tr>
<td>Medical/Surgical</td>
<td>0.99</td>
<td>0.99</td>
</tr>
<tr>
<td>Neonatal ICU</td>
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<td>1</td>
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<tr>
<td>Nursery</td>
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<td>1</td>
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<tr>
<td>Obstetrics</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Pediatric ICU</td>
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<td>1</td>
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<tr>
<td>Procedural</td>
<td>0.99</td>
<td>0.99</td>
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<td>Rehabilitation</td>
<td>1.00</td>
<td>1</td>
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<tr>
<td>Virtual/Holding</td>
<td>1.00</td>
<td>0.99</td>
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### Model Performance: Validation

Test metrics for one randomly selected day in holdout days at one hospital

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<tbody>
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<td>Intensive care Unit (ICU)</td>
<td>0.91</td>
<td>0.91</td>
</tr>
<tr>
<td>Medical/Surgical</td>
<td>0.82</td>
<td>0.82</td>
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<tr>
<td>Neonatal ICU</td>
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<td>Pediatric ICU</td>
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<td>Procedural</td>
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<tr>
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<td>0.99</td>
<td>1</td>
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Data-driven Modeling of EHR Configurations

- Scalable during pandemic
  - Able to support real-time reporting

- Validation of manual processes

- Can be applied to other use cases that require classifying healthcare process patient states
  - Ventilator use tracking
International development and deployment of evidence-based COVID-19 Response Guidelines encoded with SNOMED CT & the Omaha System
Acknowledgments

Original Team Members
March 9, 2020

- Debra Eardley, DNP, RN, APHN-BC
- Kristin Erickson, MSN, APHN-BC, RN, RN
- Clarence Jones, MEd, BA
- Crystal Maertens
- Kari Miller, DNP, RN, PHN
- Emily Robb, RN, PHN, SANE
- Norah Savard, BSN
- Robin R. Austin, PhD, DNP, DC, RN-BC
- Karen S. Martin, RN, MSN, FAAN
- Hue-MAN Partnership
- Champ Software
- UMN SON Center for Nursing Informatics

To Date: Contributions 233 Participants from 8 Countries and 26 States

- AMIA NI-WG
- AMIA PH-WG
- APHA PHN Section
- APHA HIIT Section
- UMN CTSI
- American Heart Association
- US CDC
- University of Iowa Center for Nursing Classification & Clinical Effectiveness
- Tricom
- Tanya Friese
- Tamara Kinkaid
- Morgan Skala
- MaryElaine Southard
- Hiba Abbas
- Elizabeth Zeno
- Lois Walters-Threat
- Cammie Marti
- Deborah Shelton
- Lindsay Novacek
- Matthew Rodriguez
- Canada
- China
- Germany
- Ireland
- The Netherlands
- New Zealand
- Singapore
- Turkey
Purpose

- To facilitate a conversation around best practices for using the Omaha System/SNOMED CT/Other coding systems to support COVID-19 disease prevention and control activities and documentation at the individual, family, and community levels.

- Evidence-based guidelines will be shared that will enable local and state public health agencies to disseminate best practices in software and to generate consistent data regarding COVID-19 pandemic preparedness and responses.
Omaha System / Omaha System Guidelines

Omahasystem.org | Omahasystemguidelines.org

The Omaha System

- Problem Classification Scheme
- Intervention Scheme
- Problem Rating Scale for Outcomes

- Problem Classification Scheme:
  - Environmental
  - Psychosocial
  - Physiological
  - Health Related Behaviors

- Intervention Scheme:
  - Identifies
  - Describes

- Problem Rating Scale for Outcomes:
  - Class: 1=Lowest, 5=Highest

- Definitions:
  - Signs and Symptoms
  - have unique

- Problems:
  - used for documenting
  - standardized terms

- Webinar March 12, 2020
  - Webinar Slides
  - COVID-19 Response Guideline
  - COVID-19 Response Guidelines by Role (Word document)
  - COVID-19 Response Guideline by Role (Excel document)
  - COVID-19 Response Metadata
Each intervention (row) is dual-encoded with SNOMED CT and Omaha System codes. In addition, we provide ICD-10, LOINC, and Procedure Codes (HCPCS, CPT)
Timeline

- March 9: Initial announcement of the project, and draft guideline development begins
- March 12: Initial webinar reviewing initial guideline, 43 interventions
- March 13: Announcement of follow up webinars through April
- March 19: Webinar to the AMIA PHI-WG
- March 20: Medication actions/side effects (ACE2/ARB)
- March 23: Corrections roles reviewed
- March 27: Triage, Telephonic Case Management, Corrections roles
- April 2: Collaboration initiated to develop iOS and Android App to disseminate guideline
- April 3: School Nurse, Homeless Shelter Outreach, Triage roles; wellness, end-of-life care
- April 10: Child Protection, Individuals with ID roles; spiritual care, basic needs coordination
- April 17: Last call for roles in version 1.0.0 of app
- April 24: Update references and coding
Participation, Intervention Numbers, Roles

![Graph showing participation, intervention numbers, and roles over time.](image-url)

- **Participants (N=233)**
- **Targets (N=25)**
- **Interventions (N=83)**
- **Roles (N=19)**

**Dates:**
- 9-Mar-20
- 11-Mar-20
- 13-Mar-20
- 15-Mar-20
- 17-Mar-20
- 19-Mar-20
- 21-Mar-20
- 23-Mar-20
- 25-Mar-20
- 27-Mar-20
- 29-Mar-20
- 31-Mar-20
- 2-Apr-20
- 4-Apr-20
- 6-Apr-20
- 8-Apr-20
- 10-Apr-20
Category Growth Across Versions
Target Frequencies

- infection precautions (13)
- sickness/injury care (10)
- supplies (5)
- behavior modification (4)
- medication coordination/ordering (4)
- signs/symptoms -physical (4)
- coping skills (3)
- dietary management (3)
- end of life care (3)
- home (3)
- other community resources (3)
- personal hygiene (3)
- safety (3)

- spiritual care (3)
- wellness (3)
- laboratory findings (2)
- legal system (2)
- medication action/side effects (2)
- communication (1)
- continuity of care (1)
- environment (1)
- growth/development care (1)
- medical/dental care (1)
- specimen collection (1)
- stress management (1)
- support system (1)
# Roles and Related Interventions

<table>
<thead>
<tr>
<th>Role</th>
<th>Case Management</th>
<th>Surveillance</th>
<th>Teaching, Guidance, and Counseling</th>
<th>Treatments and Procedures</th>
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<tbody>
<tr>
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<td>Client as actor - Self-care and household...</td>
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<td>Triage</td>
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The chart above illustrates the distribution of roles and related interventions across various sectors and related activities.
Collaboration welcome!

Next steps:

- Registration free for Friday webinar @
  https://tinyurl.com/OmahaSystemCOVID19reg

- Adding roles and interventions through 4/17/2020
- Submitting app to App Store and Google Play Tuesday 4/21/2020
- Reviewing all evidence and interventions on 4/24/2020

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Using a cognitive patient care device as an essential centerpiece of the COVID-19 clinical response
Inspiren

PPE DETECTION & INFECTION CONTROL USING AI & COMPUTER VISION

PROTECTING PATIENTS  SAFEGUARDING STAFF
REN SCAN’S
GESTURE ACTIVATED SENSORS
DETECT THE PRESENCE AND
PROPER WEAR OF PPE

DETECTS
ISOLATION
GOWNS

DETECTS
EYE
PROTECTION &
MASK

DETECTS
GLOVES

DETECTS
SOPHISTICATED OBJECT/NATURAL BODY MOVEMENT RECOGNITION SOFTWARE IMMEDIATELY IDENTIFIES THE PROPER OR IMPROPER WEAR OF PPE
REN SCAN™ analyzes in real-time the proper wearing of PPE prior to and after contacts with patients. It also collects data on hand hygiene & contact tracing.
REN SCAN™
EXTRAPOLATES DATA ON
- IDENTITY OF STAFF
- NATURE OF PATIENT CONTACT
- DURATION/FREQUENCY OF PATIENT-STAFF INTERACTIONS
- IMPROPER REMOVAL OF PPE

Inside Patient Rooms

Touching of one's mouth, nose, or face
IN THE EVENT OF POTENTIAL EXPOSURE, REN SCAN™ PROVIDES CRITICAL DATA ON:

- CONTACT HISTORY WITH PATIENT ROOMS
- USE OF PPE DURING PATIENT VISITATION
- SUBSEQUENT STAFF VISITS TO OTHER LOCATIONS
REN SCAN™ (IN DEVELOPMENT) COLLECTS DATA ON
- THERMAL IMAGING TEMPERATURE DETECTION
- DENSITY OF CROWDS
- DISTANCE BETWEEN PEOPLE

*LED INDICATOR

HIGH CROWD DENSITY
INSTALLS IN SECONDS

Designed for easy implementation and seamless integration into the care environment
Audience Q&A
AMIA’s 2020 Virtual Clinical Informatics Conference

Webpage: https://www.amia.org/cic2020

Clinical and Health Informatics Practitioners… CIC is YOUR conference.